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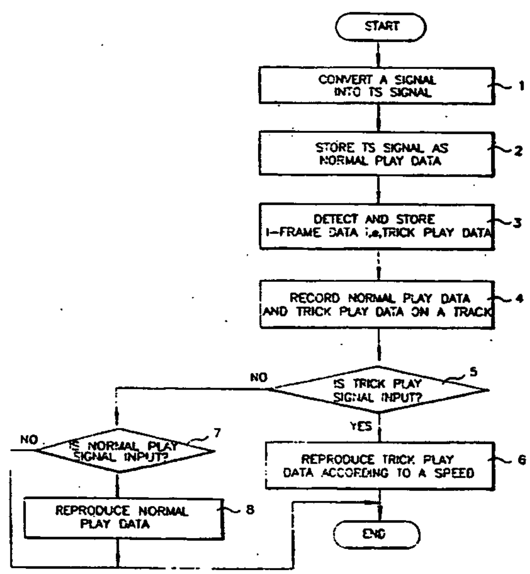
(54) Variable-speed reproducing method for DVCR

(57) A variable-speed reproducing method for DVCR comprising the steps of: (1) converting a transported signal into a transport stream (TS) signal; (2) storing the converted TS signal as normal play data; (3) detecting trick play data from the converted TS signal; (4) separately recording the trick play data and normal play data formed in the steps 2 and 3; and (5 and 6) if a trick play signal is input, reading and reproducing only the recorded trick play data at a corresponding speed, thereby facilitating trick play by DVCR.

FIG.2



EP 0 693 858 A2

Description

The present invention relates to a variable-speed reproducing method for a digital video cassette recorder (DVCR) for recording a transmitted ATV signal on tape and for variable-speed reproducing and normal-speed reproducing of the recorded signal.

Generally, if a compressed ATV signal is recorded on a tape of 1/4", as shown in Fig.1, it is very hard to variable-speed reproduce the compressed ATV signal because a location in a track and the amount thereof which a head reads vary in accordance with different speeds in variable-speed playback.

In conventional technology, there is a method for loading data useful for variable-speed playback only on a common area taken from locations where a head traces along tracks at different speeds. There is another method for loading data useful for variable-speed playback on a location where the head traces along a track at the respective speeds. However, in the first method, the common area is so small that the data to load should be reduced, resulting in bad picture quality. In the second method, the data should be loaded on a predetermined location in accordance with speeds, resulting in difficult and complicated tracking by the head.

Therefore, an embodiment of the present invention may provide a variable-speed reproducing method for DVCR in which trick play data for trick play and normal playback data for normal-speed playback are separately recorded to facilitate variable-speed playback and normal-speed playback.

According to the present invention, there is provided a variable-speed reproducing method for DVCR comprising the steps of: demodulating a transported ATV signal in a receiver and converting it into a transport stream (TS) signal; receiving the converted TS signal via an interface and storing it as normal play data; detecting trick play data from the converted TS signal; separately recording the trick play data and normal play data formed in the normal play data storing step and trick play data detecting step; and if a trick play signal is input, reading and reproducing only the recorded trick play data at a corresponding speed.

For a better understanding of the invention, and to show how the same may be carried into effect, reference will now be made, purely by way of example, to the accompanying drawings in which:-

Fig.1 illustrates a tracking path of a general head;

Fig.2 is a flowchart of a variable-speed reproducing method;

Fig.3 is a diagram of a transmission port for an ATV signal transmission;

Fig.4A illustrates a format of a TS signal;

Fig.4B illustrates a format of a PS signal;

Fig.5 is a frame diagram of the ATV signal;

Fig.6 illustrates a state of data recorded on a track

Fig.7 is a diagram of a tape;

Fig.8A indicates traveling speeds of tape in forward variable-speed playback;

Fig.8B indicates traveling speeds of tape in reverse variable-speed playback according to one embodiment;

Fig.9 illustrates a traveling speed of tape in reverse variable-speed playback according to another embodiment; and

Fig.10 is a block diagram of a circuit employed in the above embodiments.

Referring to Fig.2, in step 1, a transmitted ATV signal is demodulated and decoded in a receiver so that it is converted to a transport stream signal which has a bandwidth of 19.3Mbps and is transmitted in units of 188-byte packets.

As shown in Fig.3, for the transport of the ATV signal, at a transmission port, a video signal and audio signal are encoded respectively in a video encoder 11 and audio encoder 12 and reconstructed in packets suitable for transport through packetizers 13 and 14, thereby forming a video packetized elementary stream (PES) and audio PES. They are formed into program stream (PS) signal and transport stream (TS) signal through PS multiplexer 15 and TS multiplexer 16.

Here, in TS multiplexer 16, the TS signal is formed by re-dividing and packetizing the video and audio PESs in

predetermined units suitable for transport, as shown in Fig.4A. By doing so, a transport header 17 and PES header 18 are loaded at the beginning of respective packets composed of encoded audio and video signals. The packets are re-modulated for use in transport and transmitted as an ATV signal.

In PS multiplexer 15, the PS signal is formed by multiplexing the video and audio PESs, as shown in Fig.4B. The PS signal is used loading only PES header 18.

The transported ATV signal is converted to the TS signal which is a packet of 188 bytes and has a 19.3Mbps data rate. However, since the transport rate of a signal to be recorded is smaller than 24.95Mbps which is the video recording rate of standard definition (SD)-DVCR of 1/4", there is space above 5Mbps even after the transported ATV signal is recorded. For easy variable-speed playback of VCR, this enables only I-frame data used as trick play data to be recorded in the space.

After the TS signal converting step, the converted TS signal is temporarily stored and delayed as normal play data in step 2. In step 3, trick play data is detected from the TS signal.

Since a method of removing inter-frame redundancy is used in compressing the image, the transported ATV signal is divided into I-frame I, P-frame P, and B-frame B according to compressed data as shown in Fig.5.

I-frame I uses a compression method in a frame not an intra-frame compression method, and uses a method of compressing spatial redundancy only with discrete cosine transform (DCT) and variable length coding (VLC).

P-frame P uses a compression method using previous frame of data. In order to increase compression rate and remove temporal redundancy between pictures, the P-frame uses a method of compressing the present frame by using the pervious frame. Here, as the difference information between the previous frame and present frame, a motion vector is used.

B-frame B uses a compression method using the previous frame and future frame, and uses bidirectional frame of I-frame I and P-frame P or P-frame P and P-frame P.

B-frame B and P-frame P, not I-frame I, can form the present frame when the previous and future data are precisely reconstructed. They are not appropriate for trick play data. I-frame can be reconstructed regardless of the previous and future frames and is suitable for trick play data for variable-speed playback.

Step 3 for detecting trick play data is explained in detail as follows.

First, the converted TS signal is system-decoded and its transport header is removed so that the signal is converted into a video stream. A start code is separated from the PES header of the converted video stream. Since the property of the frame is shown in the respective headers, the header is separated from the start code so that only I-frame data used as trick play data is detected and stored.

To perform step 2 of storing normal data simultaneously with step 3 of detecting trick play data it is necessary to carry out delaying for a time required to detect trick play data.

In step 4, the trick play data of step 2 and normal play data of step 3 are separately recorded in predetermined units.

As shown in Fig.6, the trick play data is recorded in a length of 30 tracks, whereas the normal play data is recorded in a length of 120 tracks. The trick play data and normal play data are alternately recorded. In other words, since trick play tracks for trick play data are 30 and normal play tracks for normal play data are 120, 30 tracks of trick play data and 120 tracks of normal play data appear alternately.

The state in which the trick play data and normal play data are recorded will be described with reference to Fig.7.

The track location where data for image playback is recorded falls from 16 lines to 167 lines which are made up of 90 bytes. The track is divided into a video data storing area where pure data for image playback is recorded, an area where data sync and ID code are recorded, an area where video auxiliary data is recorded, and an area where inner parity and outer parity are recorded.

In a normal play track where normal play data of TS signal is recorded, TS signals are serially recorded.

In a trick play track where trick play data is recorded, trick play data of I-frame data is recorded. The trick play track starts from the beginning of the trick play data, i.e., the beginning of I-frame data. In other words, the beginning of the I-frame data is recorded at the start of the trick play track.

Here, the trick play data is recorded only as much as the amount corresponding to the length of the trick play track where the trick play data is recorded. According to the amount of the trick play data, the trick play track where the trick play data is recorded is insufficient or enough.

There are cases when the amount of trick play data is greater or smaller than the amount corresponding to the length of the trick play track. In the case when the amount of the trick play data is smaller than the length of the trick play track corresponding to 30 tracks, dummy data is recorded on the left tracks to fill the empty area. In the case when the trick play data is greater than the length of the trick play track corresponding to 30 tracks, in other words, when overflow is produced, left trick play data is removed and not recorded.

After the trick play data and normal play data are recorded, steps 5 and 6 detect if a trick play signal is input or not, and if input, read and reproduce only trick play data recorded according to a corresponding speed.

Specifically, steps 5 and 6 of trick play comprise a step of, if the trick play signal is input, skipping trick play data and normal play data recorded according to a corresponding speed and a step of reading and reproducing only corre-

sponding trick play data out of the trick play data recorded according to the corresponding speed. The steps 5 and 6 will be described with reference to Figs.8A and 8B.

In order to perform forward trick play, as shown in Fig.8, skipping and reading are repeated so that an average speed becomes different from a normal speed. This will de explained in detail.

Suppose that the traveling speed of tape in normal play V, the speed multiple number in skipping is K, the time of skipping track is Ts, the time when the traveling speed of tape is raised in skipping is tr, the time when the traveling speed of tape falls in skipping is tf, the time of reading a track is Tr, the entire traveling distance of tape in skipping and reading is L, and the time of trick play is TN, the number n of variable speed is given

$$n=TN/(Ts+Tr) \qquad \text{equation (1)}$$

Time TN of trick play is given

$$TN=L/V$$

$$=(KVTs-(K-1)V(tr+tf)/2+VTr)/V$$

Then, time TN of trick play can be

$$TN=KTs-(k-1)(tr+tf)/2+Tr \qquad \text{equation (2)}$$

If time tr when the traveling speed of tape is raised in skipping and time tf when the traveling speed of tape falls in skipping are given 50ms, and the speed is two-fold, a step in which 120 tracks of normal play track are skipped and 30 tracks of trick play track are read is repeated. In other words, since time TN of 150 tracks is 500ms in normal play and time tr of reading 30 tracks is 100ms in trick play, if these factors are substituted in equation (1), time Ts of skipping a track is 150ms. If this result is substituted in equation (2), the speed multiple number K is 3.5. In skipping, if 120 tracks of normal play tracks are skipped at 3.5-fold speed, trick play is performed at two-fold speed.

In other words, in the case of two-fold play, 120 tracks where normal play data is recorded are skipped and 30 tracks where trick play data is recorded are read and reproduced.

If time tr when the traveling speed of tape is raised in skipping and time tf when the traveling speed of tape falls in skipping are 50ms, and the speed is eight-fold speed, a step where 570 tracks of normal play tracks and trick play tracks are skipped and 30 tracks of trick play tracks are read is repeated.

In other words, since time TN of 600 tracks is 2000ms in normal play and time tr of reading 30 tracks is 100ms in trick play, if these factors are substituted in equation (1), time Ts of skipping a track is 150ms. If this result is substituted in equation (2), the speed multiple number K is 18.5. In skipping, if 570 tracks of normal play tracks are skipped at 18.5-fold speed, trick play is performed at eight-fold speed.

In the case of eight-fold play, 570 tracks where normal play data and trick play data are recorded are skipped and 30 tracks where trick play data is recorded are read and reproduced.

For the reverse trick play, similar to the forward trick play, as shown in Fig.8B, skipping and reading are repeated so that the average speed becomes different from the normal speed. Since the traveling direction of tape is opposite that of the forward direction, the traveling speed of tape is negative. Except this, other conditions are the same as in the forward direction. In other words, in the case when the trick play is reversely performed, corresponding trick play data out of recorded trick play data is read and reproduced at a reversed normal speed and returns to a reverse high speed.

In another embodiment of reverse trick play, if a reverse trick play signal is input, a head drum is reversely rotated with a capstan so that a reverse skipping and reverse reading are performed similar to the forward trick play. This step will be described with reference to Fig.9.

In the case when the head drum and capstan are rotated at the normal speed in the forward direction, the head traces the track as (b). In the case when the head drum and capstan operate in skipping, the head traces the track as (c).

In the case when the head drum and capstan operate reversely, the head traces the track as (a). In the case when the head drum and capstan operate reversely at the normal speed, the head traces the track as (d). In the case when the head drum and capstan operate reversely and in skipping, the head traces the track as (e).

When the head reads out the data recorded on the tracks and data stream in opposite direction to that of the data recorded on the tracks is created, this data is stored in a trick play buffer and read in the opposite direction to read out the original data stream. By doing so, the reverse trick play is performed similar to the forward trick play.

In the case of reverse trick play, corresponding trick play data out of the recorded trick play data is read out in the reverse direction and stored. The stored data is re-read out reversely and reproduced.

In steps 7 and 8, after the trick play data and normal play data are recorded, if the trick play signal is not input, it is detected whether a normal play signal is input or not. If the normal play signal is input, only the recorded normal play data is read out and reproduced.

The process of trick play by DVCR is carried out with the hardware shown in Fig.10 and described in detail as follows.

In modulator/forward error correction (FEC) decoder 21, a transported ATV signal is demodulated and its errors inserted during transport are removed to thereby extract a TS signal prior to modulation at a transport port.

The transport header of the TS signal having the bandwidth of 19.3Mbps, output from modulator/decoder 21 and

made up of packets of 188 bytes, is removed in system decoder 22 and converted into a video stream. The start code of the signal is separated in start code separator/I-frame extractor 23 to thereby extract an I-frame. The extracted I-frame for trick play is temporarily stored in trick play buffer 24.

The TS signal having the bandwidth of 19.3Mbps, output from modulator/decoder 21 and made up of packets of 188 bytes, is recorded for normal play. To make the time delay in extracting the I-frame conform for trick play, the signal is temporarily stored in normal play buffer 26.

Trick play data and normal play data stored in trick play buffer 24 and normal play buffer 26 are output through multiplexer 27 under the control of system controller 30. The data output from multiplexer 27 is FEC-encoded in FEC encoder 28, channel-modulated in channel modulator 29, and then recorded on tape via a channel. Here, system controller 30 controls servo controller 31 to facilitate recording.

The I-frame for trick play should be recorded only on 30 tracks of trick play tracks. This is controlled by overflow controller 25. If the I-frame data is greater than the amount of 30 tracks and creates overflow, excessive data is removed. If the I-frame data is smaller than the amount of 30 tracks, dummy data is filled therein.

In the case when the recorded data is reproduced, the data read out from tape is channel-demodulated in channel demodulator 32 and FEC-decoded in FEC decoder 33. Then, the decoded data is output to demultiplexer 34. Data output from FEC decoder 33 is demultiplexed under the control of system controller 30 and divided into trick play data and normal play data. The data is stored respectively in trick play buffer 36 and normal play buffer 37. The data stored in trick play buffer 36 and normal play buffer 37 is output to switch 40 under the control of system controller. Here, in normal play, only the normal play data stored in normal play buffer 37 is output to switch 40 under the control of system controller 30.

In trick play, the trick play data and normal play data are demultiplexed through demultiplexer 34 according to reading and skipping. In reading, the data output from FEC decoder 33 is demultiplexed and stored to trick play buffer 36 by demultiplexer 34. In skipping, the data output from FEC decoder 33 is demultiplexed and stored in normal play buffer 37 by demultiplexer 34. The trick play data stored in trick play buffer 36 is re-packetized in packetizer 38 and transported and reproduced through multiplexer 39 and switch 40 under the control of system controller 30.

In skipping, however, in order to transport data in 19.3Mbps, a null-TS packet corresponding to null data is output from null-TS inserter 35. Under the control of system controller 30, in reading, multiplexer 39 selects the trick play data output from trick play buffer 36 and outputs the selected data to switch 40. In skipping, the null-TS packet output from null-TS inserter 35 is selected and output to switch 40.

As described above, the present invention overcomes the difficulty in data format and head tracking to thereby facilitate trick play by DVCR.

As previously shown it is desirable to avoid the duplication inherent in trick mode data as much as possible. The scheme for tracking the tape should be as simple as possible and the trick play method itself should be flexible to allow for possible future enhancement. Clearly, whatever scheme is chosen trick play quality should be acceptable to the consumer.

A brief outline of ATV-Video Tape Recording (VCR) is as follows:-

1) The rate of transmission in terrestrial mode of ATV payload data is 19.3Mbps.

2) The payload data is a transport stream as specified in the MPEG-2 standard.

3) ATV bitstreams are recorded onto the tape based on the SD track format.

4) Transport packets are recorded intact for normal playback.

5) The ECC structure of the SD format is maintained.

6) The SD Digital VCR can accommodate 24.948Mbs into its video sectors.

7) The excess space, 5.648Mbps (24.948-19.3), can be used to record redundant data for trick play.

8) Data generated by the ATV-VCR is decodable by the ATV decoder.

Referring again to Figure 6 the following comments are added regarding the recording format.

In normal play track recording an ATV transport stream is recorded sequentially in the video sector and the SD synch block structure is maintained.

In trick play track recording a group of 30 trick play tracks holds one I-frame. An ATV video bitstream containing only the I-frame data is recorded from the starting synch block.

The comments made above about dummy data are again referred to.

A brief summary of the recording features is as follows:-

In SD format, 300 tracks per second are processed.

Only video sectors in SD format are used to record ATV data, and audio sectors are reserved for future use.

240 tracks hold 19.3 Mbits of ATV data.

The remaining 60 tracks are used for trick play data.

Only I-frame data extracted from the ATV bitstream are used for trick play.

In trick play mode, the trick play tracks are read at the normal speed and the normal play tracks are skipped at an accelerated high speed.

Since the extracted I-frame data are recorded without further compression, variable length coding/decoding is not needed.

The resultant picture quality in trick play is as good as in normal play.

The trick play speed is flexible and extensible to higher speeds, depending on mechanical support.

A track format for ATV compatible digital VCR according to embodiments of the present invention has the following advantages:-

1. DSP hardware complexity is inexpensive since variable length coding/decoding and complex multiplexing are not needed.

2. Trick play speeds are very flexible. Up to 8 times the normal speed can be achieved using the current tracking mechanism.

3. Trick play speeds can be further enhanced simply by improving the tracking mechanism.

4. The trick play quality is high. The amount of I-frame data used in trick play is equal to that of an ATV video stream read at normal speed.

5. An audio sector in SD format is left for future use.

Tape acceleration should be smooth when moving from one tape speed to another in order to avoid possible damage to either the capstan motor or the tape. This applies even though the diameter of the drum and the tape wrap angle are relatively small.

Claims

1. A variable-speed reproducing method for DVCR comprising the steps of:

   (1) converting a transported signal into a transport stream (TS) signal;

   (2) storing said converted TS signal as normal play data;

   (3) detecting trick play data from said converted TS signal;

   (4) separately recording said trick play data and normal play data formed in said steps 2 and 3; and

   (5 and 6)if a trick play signal is input, reading and reproducing only said recorded trick play data at a corresponding speed.

2. A variable-speed reproducing method for DVCR as claimed in claim 1, wherein said trick play data is composed of I-frame data.

3. A variable-speed reproducing method for DVCR as claimed in claim 1 or claim 2, wherein said TS signal falls within a bandwidth of 19.3Mbps.

4. A variable-speed reproducing method for DVCR as claimed in claim 1, 2 or 3, wherein said TS signal is transported in units of 188-byte packets.

5. A variable-speed reproducing method for DVCR as claimed in any preceding claim, wherein said step 3 comprises the steps of:
decoding and converting said TS signal into a video stream;
separating head information from said converted video stream; and
detecting and storing only I-frame data by using a start code separated from said head information.

6. A variable-speed reproducing method for DVCR as claimed in any preceding claim, wherein in said step 4, said trick play data and normal play data are separately recorded in predetermined units.

7. A variable-speed reproducing method for DVCR as claimed in any one of claims 1 to 5, wherein said trick play data and normal play data are separately and alternately recorded in predetermined units.

8. A variable-speed reproducing method for DVCR as claimed in claim 6 or 7, wherein said trick play data is recorded in a length of 30 tracks.

9. A variable-speed reproducing method for DVCR as claimed in claim 8, wherein said normal play data is recorded in a length of 120 tracks.

10. A variable-speed reproducing method for DVCR as claimed in claim 8 or 9, wherein data is recorded from the start point of said trick play data detected in said step (3) on a track where said trick play data is recorded.

11. A variable-speed reproducing method for DVCR as claimed in claim 10, wherein said trick play data is recorded along the entire length of the track on which it is recorded.

12. A variable-speed reproducing method for DVCR as claimed in claim 11, wherein if said trick play data is less than the amount corresponding to the length of the track where said trick play data is recorded, dummy data is recorded on an empty portion of the track.

13. A variable-speed reproducing method for DVCR as claimed in any preceding claim, after said step 4, further comprising steps (7 and 8) of reading and reproducing the recorded normal play data if a normal play signal is input.

14. A variable-speed reproducing method for DVCR as claimed in any preceding claim, wherein said steps (5 and 6) comprise the steps of:
if a trick play signal is input, skipping said recorded trick play data and normal play data according to a corresponding speed; and
reading and reproducing only corresponding trick play data out of the recorded trick play data according to said corresponding speed.

15. A variable-speed reproducing method for DVCR as claimed in claim 14, wherein in two-fold speed playback, 120 tracks in which said normal play data is recorded are skipped and 30 tracks in which said trick play data is recorded are read and reproduced.

16. A variable-speed reproducing method for DVCR as claimed in claim 14, wherein in eight-fold speed playback, 570 tracks in which said normal play data and trick play data are recorded are skipped and 30 tracks where said trick play data is recorded are read and reproduced.

17. A variable-speed reproducing method for DVCR as claimed in any one of claims 1 to 14 wherein in said steps (5 and 6), in the case of reverse trick play, corresponding trick play data out of the recorded trick play data is reversely read and reproduced at a normal speed.

18. A variable-speed reproducing method for DVCR as claimed in any one of claims 1 to 14, wherein in said steps (5 and 6), in the case of reverse trick play, corresponding trick play data out of the recorded trick play data is reversely read and stored and then reversely read and reproduced.

19. A variable-speed reproducing method for DVCR as claimed in any cne of claims 14 to 18 wherein for said skipping step, a null-TS packet is output.

FIG. 1
PRIOR ART

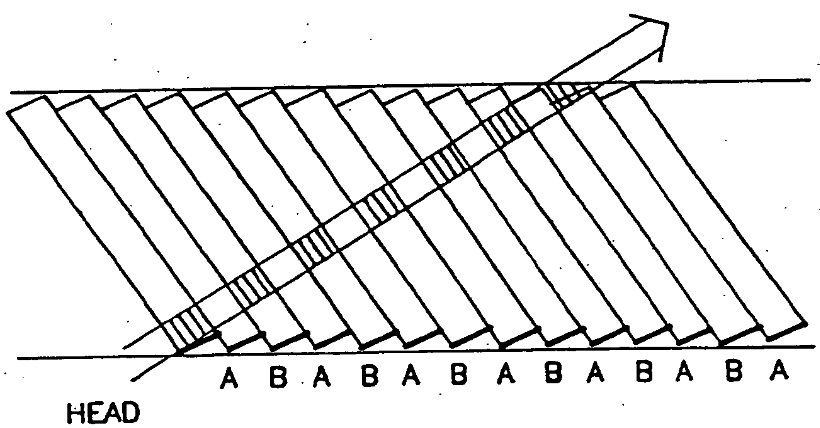


FIG.2

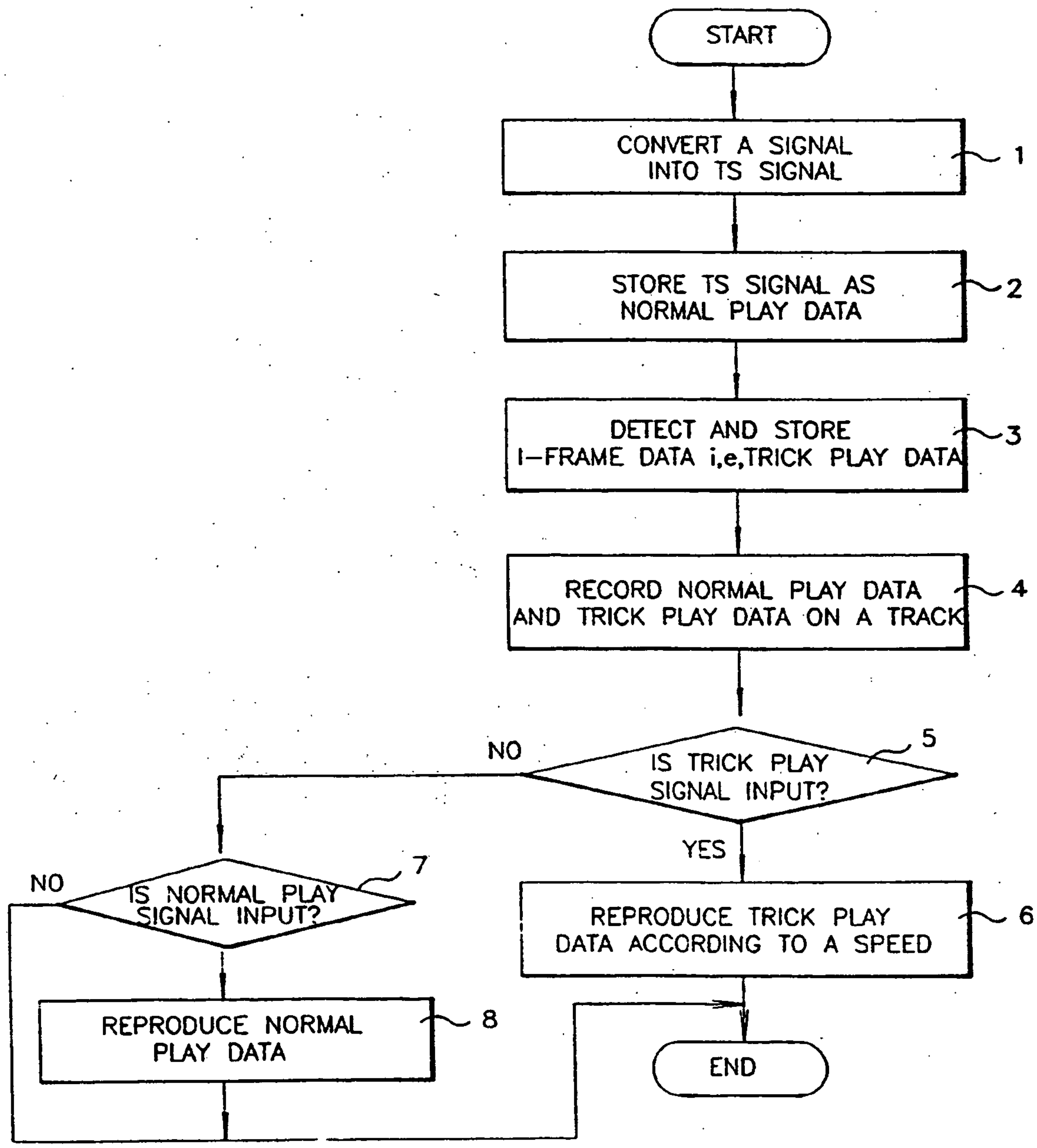

START
CONVERT A SIGNAL INTO TS SIGNAL
1
STORE TS SIGNAL AS NORMAL PLAY DATA
2
DETECT AND STORE I-FRAME DATA i,e,TRICK PLAY DATA
3
RECORD NORMAL PLAY DATA AND TRICK PLAY DATA ON A TRACK
4
IS TRICK PLAY SIGNAL INPUT?
5
NO
YES
REPRODUCE TRICK PLAY DATA ACCORDING TO A SPEED
6
IS NORMAL PLAY SIGNAL INPUT?
7
NO
REPRODUCE NORMAL PLAY DATA
8
END

FIG.3

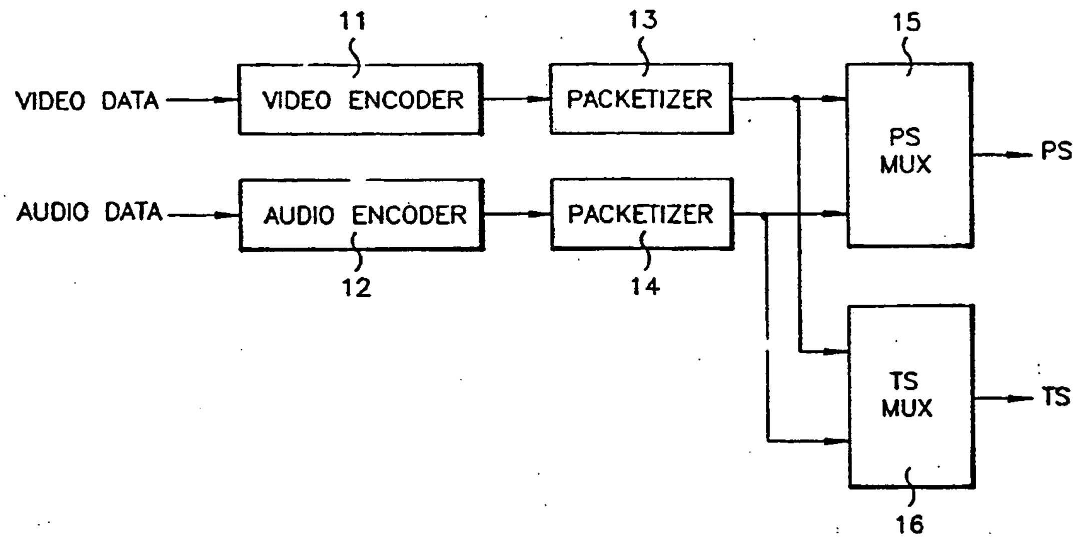


FIG.4A

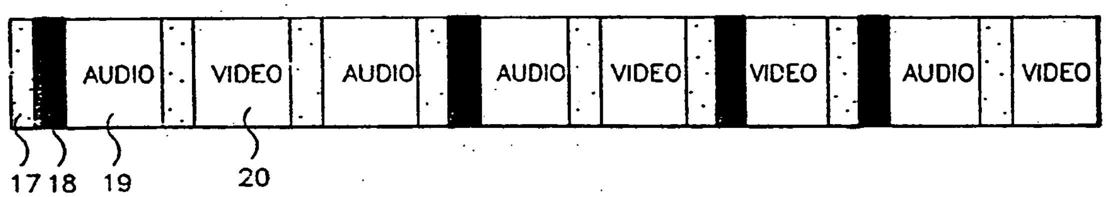


FIG.4B

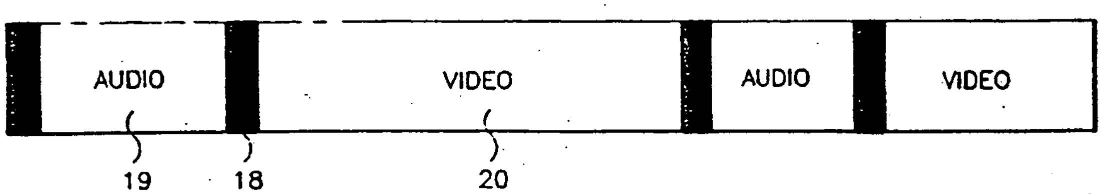


FIG.5

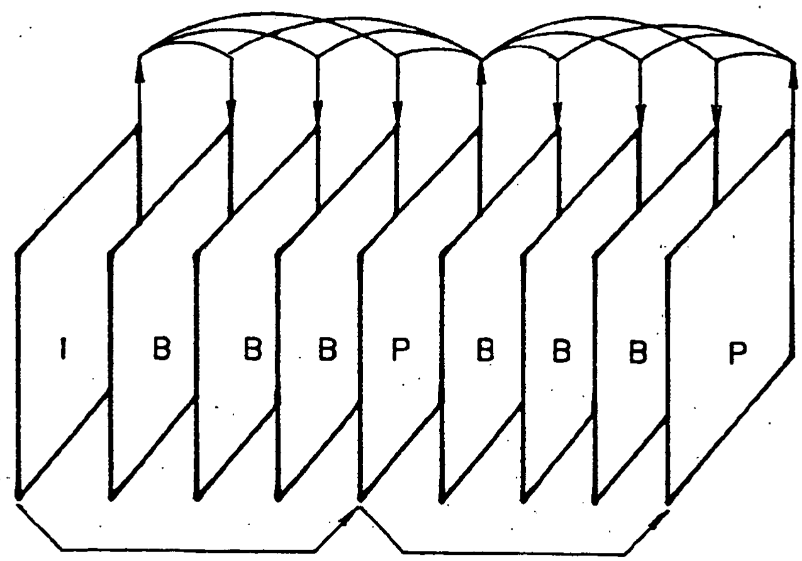
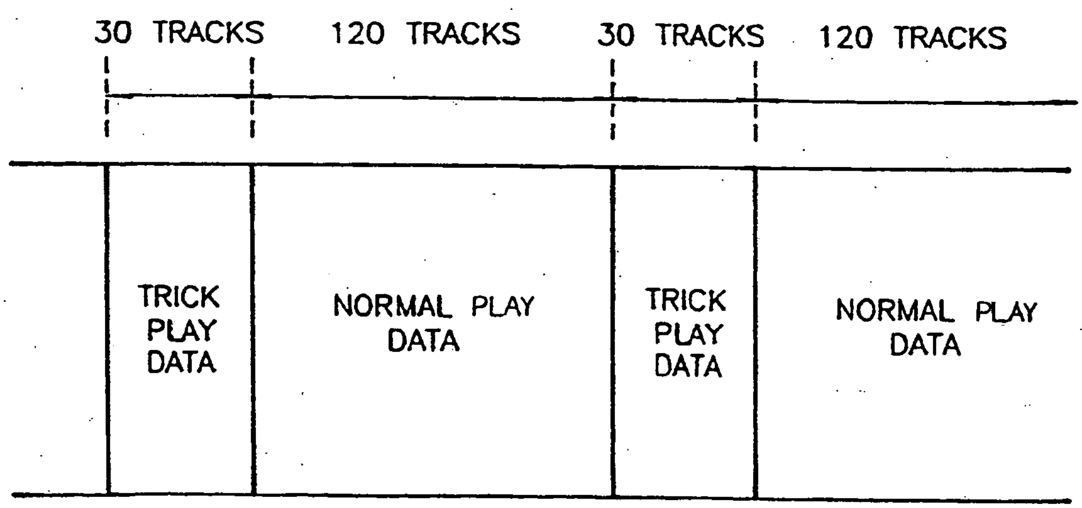
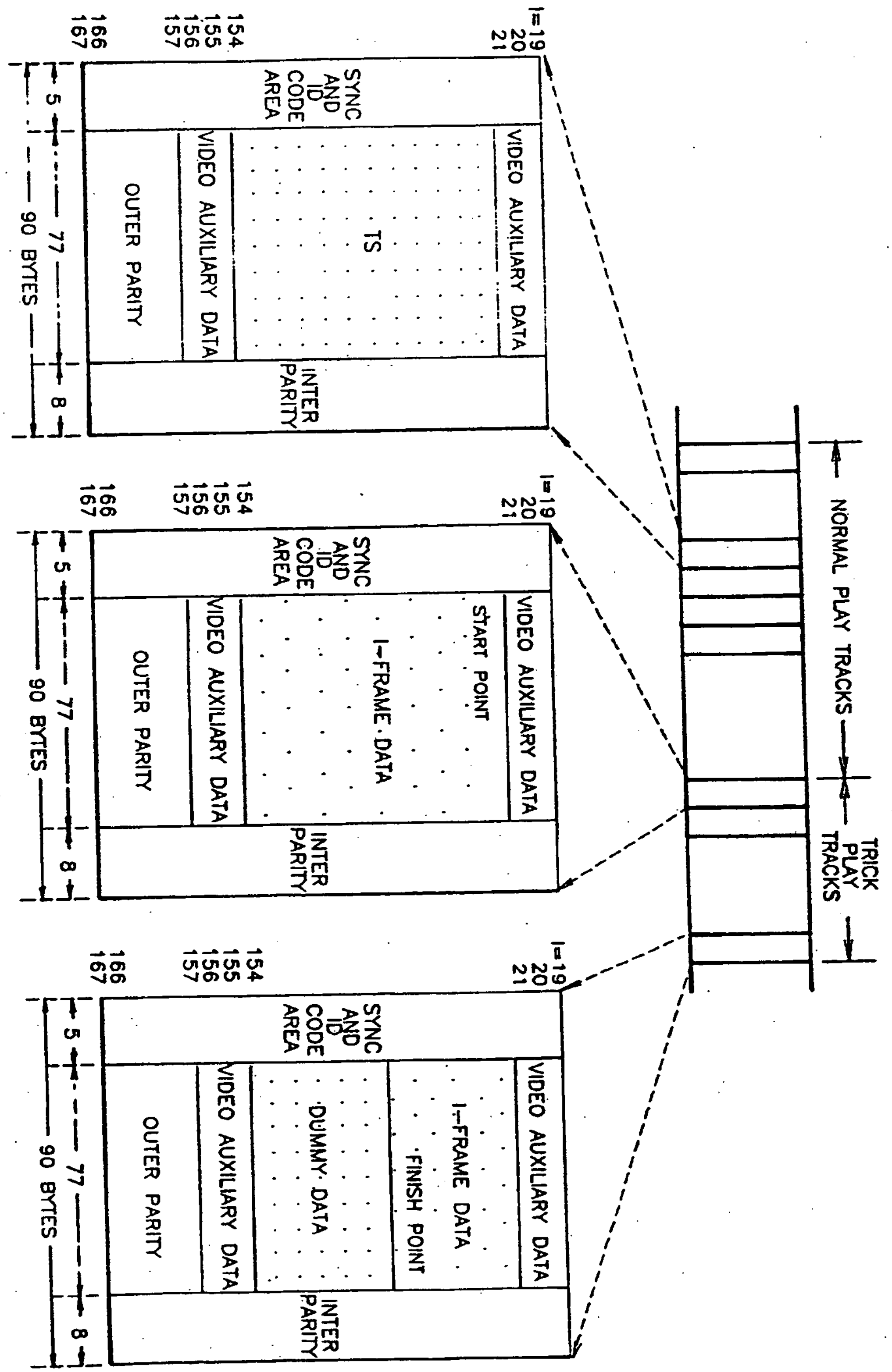

I
B
B
B
P
B
B
B
P

FIG.6


30 TRACKS
120 TRACKS
30 TRACKS
120 TRACKS
TRICK PLAY DATA
NORMAL PLAY DATA
TRICK PLAY DATA
NORMAL PLAY DATA



NORMAL PLAY TRACKS
TRICK PLAY TRACKS
I=19
20
21
154
155
156
157
166
167
SYNC AND ID CODE AREA
VIDEO AUXILIARY DATA
TS
VIDEO AUXILIARY DATA
OUTER PARITY
INTER PARITY
5
77
8
90 BYTES
START POINT
I-FRAME DATA
I-FRAME DATA
FINISH POINT
DUMMY DATA

FIG.7

FIG.8A

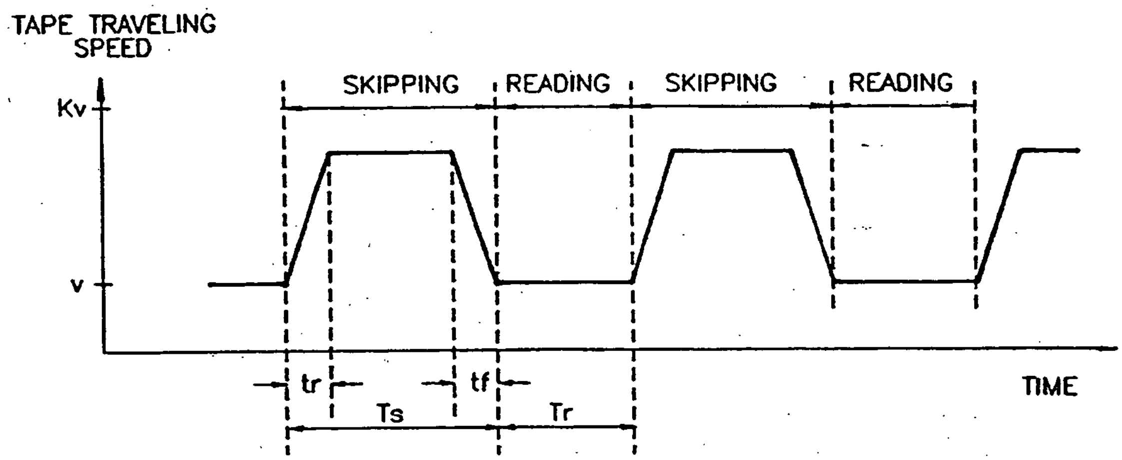

TAPE TRAVELING SPEED
SKIPPING
READING
SKIPPING
READING
Kv
v
tr
tf
Ts
Tr
TIME

FIG.8B

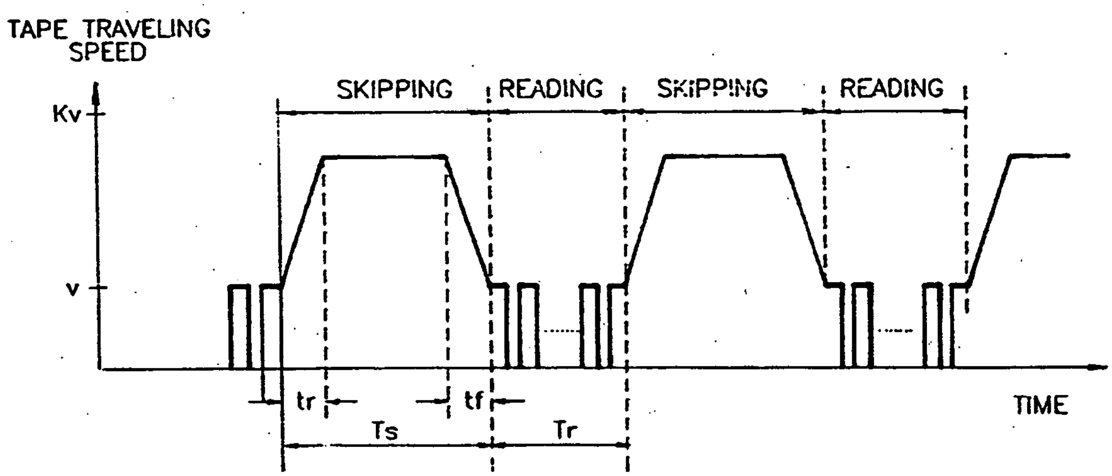

TAPE TRAVELING SPEED
SKIPPING
READING
SKIPPING
READING
Kv
v
tr
tf
Ts
Tr
TIME

FIG.9

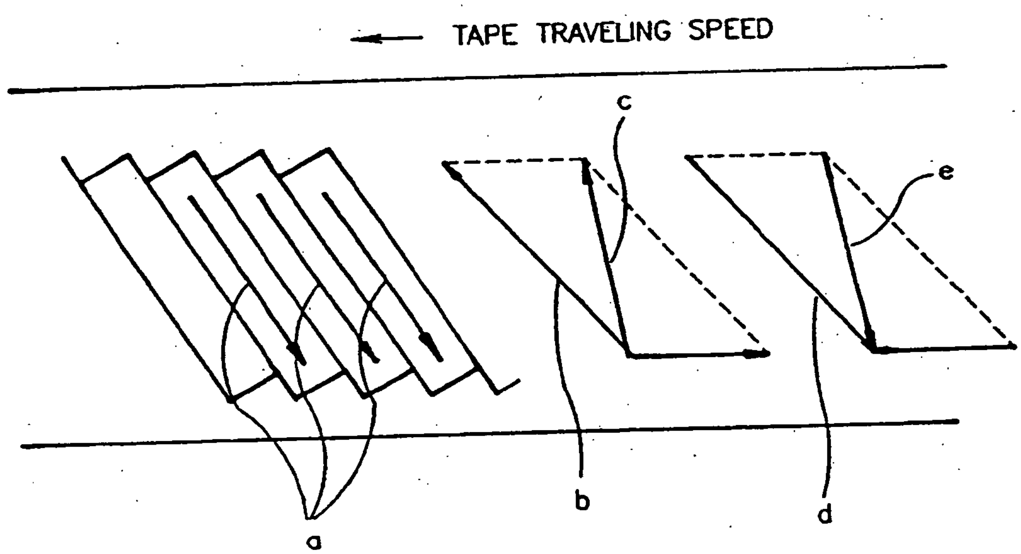
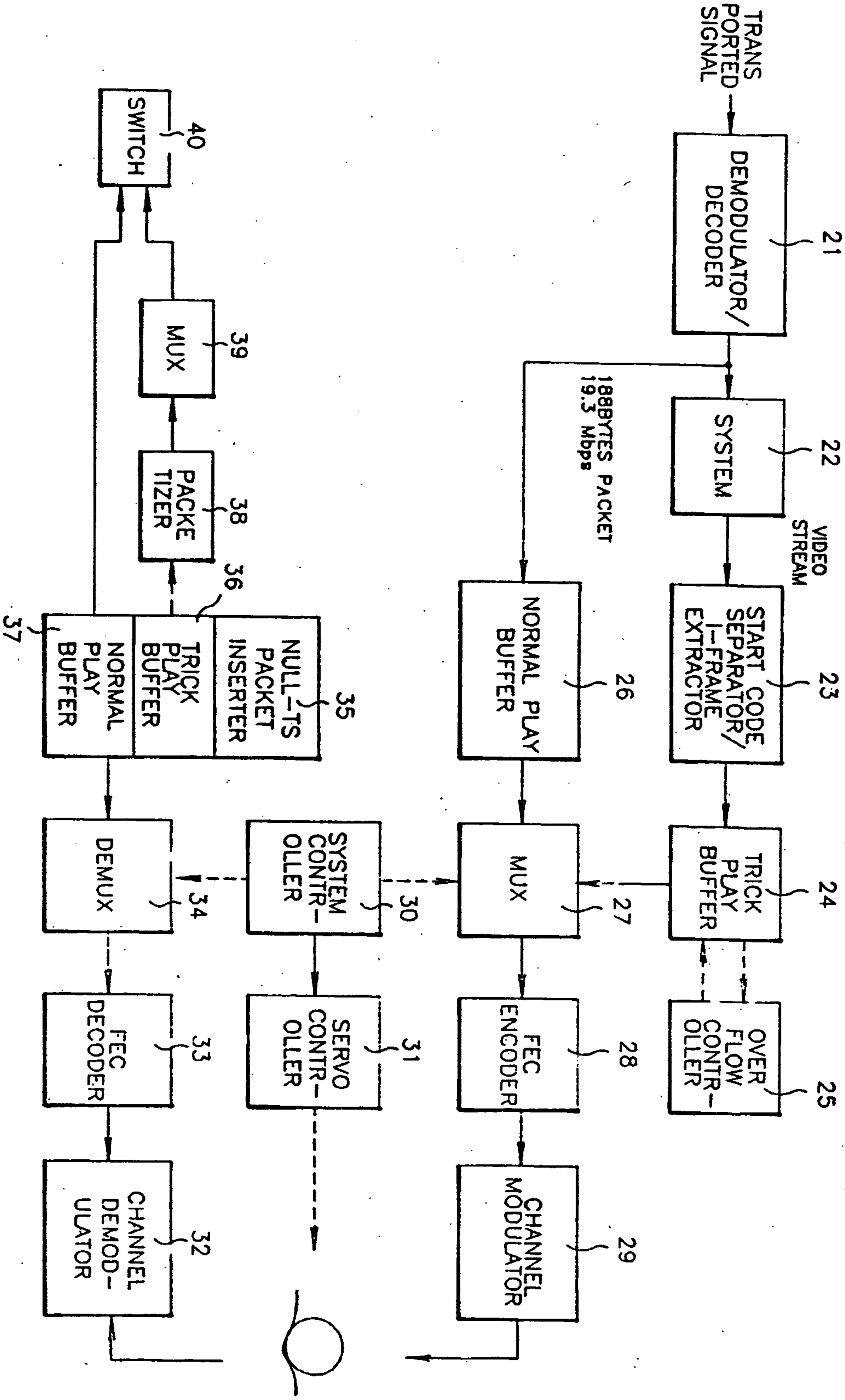


FIG.10


TRANS PORTED SIGNAL
DEMODULATOR/ DECODER
21
SYSTEM
22
VIDEO STREAM
188BYTES PACKET 19.3 Mbps
START CODE SEPARATOR/ I-FRAME EXTRACTOR
23
TRICK PLAY BUFFER
24
OVER FLOW CONTR-OLLER
25
NORMAL PLAY BUFFER
26
MUX
27
FEC ENCODER
28
CHANNEL MODULATOR
29
SYSTEM CONTR-OLLER
30
SERVO CONTR-OLLER
31
CHANNEL DEMOD-ULATOR
32
FEC DECODER
33
DEMUX
34
NULL-TS PACKET INSERTER
35
TRICK PLAY BUFFER
36
NORMAL PLAY BUFFER
37
PACKE TIZER
38
MUX
39
SWITCH
40

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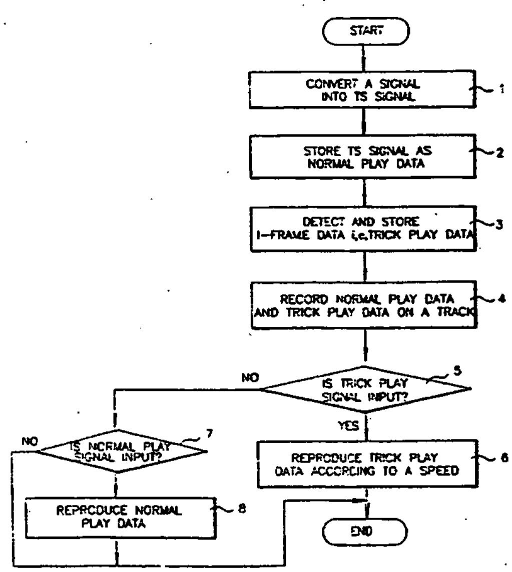
(54) **Variable-speed reproducing method for DVCR**

(57) A variable-speed reproducing method for DVCR comprising the steps of: (1) converting a transported signal into a transport stream (TS) signal; (2) storing the converted TS signal as normal play data; (3) detecting trick play data from the converted TS signal; (4) separately recording the trick play data and normal play data formed in the steps 2 and 3; and (5 and 6) if a trick play signal is input, reading and reproducing only the recorded trick play data at a corresponding speed, thereby facilitating trick play by DVCR.

FIG.2



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EUROPEAN SEARCH REPORT

Application Number
EP 95 30 4207

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	EP-A-0 596 527 (SONY CORPORATION) * the whole document * ---	1,2,5-7, 13	H04N9/804
A	EP-A-0 579 156 (SAMSUNG ELECTRONICS CO., LTD) * page 4, line 12 - page 8, line 7; figures 3-11 * ---	1,6,7, 10,11,13	
A	US-A-5 282 049 (HATAKENAKA ET AL.) * column 3, line 32 - column 10, line 22; figures 1-13 * -----	1,2,6,7, 13	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			H04N

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	18 June 1996	Verleye, J

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